



Methods and References for County-Level Estimates and Ranks

Methods for County-Level Estimates

The prevalence of diagnosed diabetes and selected risk factors by county was estimated using data from [CDC's Behavioral Risk Factor Surveillance System](#) (BRFSS) and data from the [US Census Bureau's Population Estimates Program](#). The BRFSS is an ongoing, monthly, state-based telephone survey of the adult population. The survey provides state-specific information on behavioral risk factors and preventive health practices. Respondents were considered,

- To have diabetes if they responded "yes" to the question, "Has a doctor ever told you that you have diabetes?" Women who indicated that they only had diabetes during pregnancy were not considered to have diabetes.
- To be obese if their body mass index was 30 or greater. Body mass index ($\text{weight [kg]} / \text{height [m]}^2$) was derived from self-report of height and weight.
- To be physically inactive if they answered "no" to the question, "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?"

You can view trends in county-level data beginning in 2004. Three years of data were used to improve the precision of the year-specific county-level estimates of diagnosed diabetes and selected risk factors. For example, 2003, 2004, and 2005 were used for the 2004 estimate and 2004, 2005, and 2006 were used for the 2005 estimate. Estimates were restricted to adults 20 years of age or older to be consistent with population estimates from [the US Census Bureau](#). The US Census Bureau provides year-specific county population estimates by demographic characteristics—age, sex, race, and Hispanic origin.

The county-level estimates for the over 3,200 counties or county equivalents (e.g., parish, borough, municipality) in the 50 US states, Puerto Rico and the District of Columbia were based on indirect model-dependent estimates. The model-dependent approach employs a statistical model that “borrows strength” in making an estimate for one county from BRFSS data collected in other counties. [Bayesian multilevel modeling techniques](#) were used to obtain these estimates. Separate models were developed for each of the four census regions: West, Midwest, Northeast and South. Multilevel Poisson regression models with random effects of demographic variables (age 20–44, 45–64, ≥65; race; sex) at the county-level were developed. State was included as a county-level covariate. The model specification is essentially the same as [Malec, et al.](#)

For selected years, rates were age adjusted by calculating age specific rates for the following three age groups, 20–44, 45–64, ≥65. A weighted sum based on the distribution of these three age groups from the 2000 census was then used to adjust the rates by age using the weights 0.52, 0.31, 0.17, respectively.



Methods for County Ranks

Ranks for county-level data of diagnosed diabetes and selected risk factors were based on age-adjusted prevalence rates using data from the Behavioral Risk Factor Surveillance System for all states and DC. Models were fit using a [Bayesian simulation method](#) known as Markov chain Monte Carlo. As part of the model fitting process we generated and saved two thousand random samples from the distribution of each county's age-adjusted prevalence rate. For each of these random samples we sorted the counties by prevalence and saved the counties' ranks. This gave us two thousand random samples from the distribution of each county's rank. We then used the median for the rank estimate and the 5th and 95th percentiles for a 90% confidence interval. Ranks for Puerto Rico were not generated.

References

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